

ABSTRACT OF THE DISCLOSURE

The invention provides a method of nonenzymatic ligation of a nucleic acid. The method consists of contacting a polynucleotide-3' phosphorothiolate with an acceptor polynucleotide under conditions that allow formation of a phosphodiester bond between the polynucleotide-3' phosphorothiolate and the acceptor polynucleotide. The invention also provides methods of molecular cloning. In one embodiment, the method consists of contacting an insert comprising a polynucleotide-3' phosphorothiolate with an acceptor vector under conditions that allow formation of a phosphodiester bond between the insert and the acceptor vector to generate a vector comprising an insert polynucleotide. The invention further provides a compound consisting of a polynucleotide-3' phosphorothiolate and a kit containing a polynucleotide-3' phosphorothiolate. Also provided is a method of ligating a nucleic acid using a non-sequence specific topoisomerase.